

REMARKS

This amendment is responsive to the Office Action of February 3, 2005. Reconsideration and allowance of **Claims 1-24, 28, and 55-58** are requested.

The Office Action

Claims 1-24, 28, and 55-58 remain in the application.

Claims 1-12, 14-22, 24, 28, and 58 are allowed.

Claim 13 stands rejected under 35 U.S.C §102(e) as being anticipated by Hu (US Patent No. 6,573,714).

Claim 23 stands rejected under 35 U.S.C §102(e) as being anticipated by Ozaki (US Patent No. 5,995,581).

Claims 26 and 55 stand rejected under 35 U.S.C §102(e) as being anticipated by Wendt (US Patent No. 5,821, 751).

Claims 56 and 57 are indicated as containing an allowable subject matter.

Claim 26 is cancelled.

Claim 56 and 57 are Allowable

Claims 56 and 57 have been written in independent form and include limitations of the respective base claims. It is therefore respectfully submitted that **claims 56 and 57** are allowable.

The Present Application

The present application is directed to a method for modifying an image slice in a CT scanner having a predetermined reconstruction angle. The original image is modified and updated by incorporating attenuation data acquired in additional scan path sectors. The initial attenuation data and the attenuation data acquired during scans of additional sectors within the slice is compared to produce a difference matrix. More particularly, an additional set of data is subtracted out from the initial set of data. In one embodiment, the subtraction is performed on filtered and back projected initial and additional attenuation data. In another embodiment, the subtraction is performed on initial and additional attenuation data before filtering and back

projecting. A produced difference matrix is then filtered and back projected to the image.

In accordance with another aspect of the present application, a region of interest is defined by a use of a scanner or by a known software. The region of interest is defined to include an object of interest such as a needle or an organ. The position of the needle is tracked. The region of interest is periodically adjusted in response to changes in the position of the needle. Preferably, the movement of the needle is tracked using preprocessed attenuation data. A small sub-region is centered on the needle tip, in which the maximum value of the data is found. The window is then shifted so that the location of the maximum value is at the center of the window.

The References of Record

Hu is directed to MR imaging system which employs a spatial encoding using pseudo-Fourier imaging (PFI) and selective excitation profiles. The object is excited with different phase encodings to generate a series of K-space data lines, all of the same slice (or if phase encoded in two dimensions, a volume). A Fourier transform is applied to the data lines to produce a slice (or if phase encoded in two dimensions and fancier transformed in three, a volume image). The image representation is reconstructed from K-space data lines or signals and each K-space data line carries information for the whole image. Data lines near the center of K-space carry low-frequency information (e.g. change resolution) for the whole image; whereas, data lines near the top and bottom of K-space carry high frequency information (e.g. detail resolution) for the whole image.

Ozaki is directed to determining slice positions in a CT scan. Desired slice positions (slice positions of which images a physician wants to see) coincident with an object region are set manually by the operator while viewing a CR image, which is produced through digitization by an X-ray fluoroscopy apparatus, representing an area to be imaged containing the object region of a patient body. Scan plan information is provided to the CT scanner. Tomographic images of the set slice positions can then be produced and displayed.

Wendt is directed to a method for the acquisition of image data from nuclear magnetic resonance (MR) signals.

The Claims Distinguish Patentably

Over the References of Record

Claim 13 calls for among other elements: updating the displayed slice only in the region of interest. Initially, Applicants submit that Hu is directed to the MR imaging and not the CT imaging. Since Hu neither explicitly, nor impliedly discloses CT imaging, Applicants respectfully request that Hu be removed.

If the Examiner maintains the rejection of claim 13 based on Hu, Applicants respectfully traverse the interpretation of Hu as set forth in the Office Action. **Hu** is directed to MR imaging system which employs a spatial encoding using pseudo-Fourier imaging (PFI) and selective excitation profiles. The object is excited with different phase encodings, each phase encoding carrying information about the whole image. Fourier transform transforms the data lines into an image. Updating one K-spacespace data line does not update a region of the image. Rather, it updates a frequency component of the whole image. As set forth in claim 13, the predefined portion of the displayed slice is being updated on a periodic basis. Hu does not disclose or suggest updating a portion of the displayed slice. It is therefore respectfully submitted that **claim 13** distinguishes patentably and unobviously over Hu.

Claim 23 calls for among other elements: during movement of the object, monitoring the position of the moving object in the region of interest. **Ozaki** describes that the desired slice positions are set manually by the operator or physician using a CR or pilot image. Scan plan information is then provided to the CT scanner to locate the region of interest for CT imaging. Ozaki does not disclose or suggest automatically tracking a region of interest adjacent the moving object *during* the CT scan. In addition, nowhere does Ozaki discloses or suggests automatically updating the region of interest within the displayed slice or reconstructed image based on the detected movement of the region of interest. It is therefore respectfully submitted that **claim 23** distinguishes patentably and unobviously over Ozaki.

Claim 55 calls for among other elements: irradiating a subject with X-rays; and reconstructing multiple CT slices based on a first set of the X-ray attenuation data. Applicants respectfully submit that Wendt is directed to the MR imaging and not the CT imaging. Since Wendt neither explicitly, nor impliedly discloses CT imaging, Applicants respectfully request that Wendt be removed. Nowhere does Wendt discloses or suggests irradiating the subject with X-rays and reconstructing image representation from the X-ray attenuation data. It is therefore respectfully submitted that **claim 55** distinguishes patentably and unobviously over Wendt.

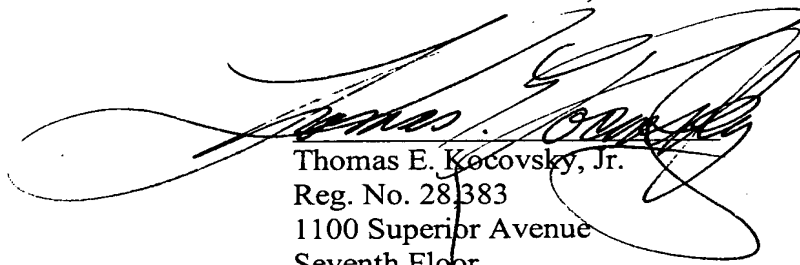
CONCLUSION

For the reasons set forth above, it is submitted that **claims 1-24, 28, and 55-58** (all claims) distinguish patentably over the references of record and meet all statutory requirements. An early allowance of all claims is requested.

In the event the Examiner considers personal contact advantageous to the disposition of this case(s), he is requested to telephone Tom Kocovsky at (216) 861-5582.

Respectfully submitted,

FAY, SHARPE, FAGAN,
MINNICH & McKEE, LLP

A large, stylized handwritten signature in black ink, which appears to read "Thomas E. Kocovsky, Jr.", is written over the printed name and address.

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